



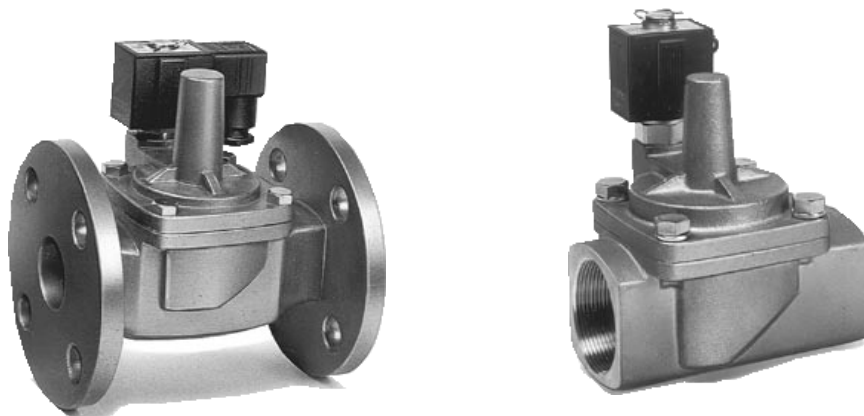
# Operation Manual

PRODUCT NAME

*PIROT OPERATED 2 PORT SOLENOID VALVE*

MODEL / Series / Product Number

VXP Series



**SMC Corporation**

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# Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of “Caution,” “Warning” or “Danger.” They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)\*1), and other safety regulations.

\*1) ISO 4414: Pneumatic fluid power -- General rules relating to systems.

ISO 4413: Hydraulic fluid power -- General rules relating to systems.

IEC 60204-1: Safety of machinery -- Electrical equipment of machines .(Part 1: General requirements)

ISO 10218-1992: Manipulating industrial robots -Safety.

etc.



## Caution

**Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.



## Warning

**Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.



## Danger

**Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

## Warning

### **1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.**

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results.

The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product.

This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

### **2. Only personnel with appropriate training should operate machinery and equipment.**

The product specified here may become unsafe if handled incorrectly.

The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

### **3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.**

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.

2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.

3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

### **4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.**

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.

2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.

3. An application which could have negative effects on people, property, or animals requiring special safety analysis.

4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.



# Safety Instructions

## Caution

### **1. The product is provided for use in manufacturing industries.**

The product herein described is basically provided for peaceful use in manufacturing industries. If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.

If anything is unclear, contact your nearest sales branch.

## **Limited warranty and Disclaimer/Compliance Requirements**

The product used is subject to the following “Limited warranty and Disclaimer” and “Compliance Requirements”.

Read and accept them before using the product.

### **Limited warranty and Disclaimer**

#### **1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.\*2)**

Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.

#### **2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.**

This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.

#### **3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.**

#### **\*2) Vacuum pads are excluded from this 1 year warranty.**

A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.

Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

### **Compliance Requirements**

#### **1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction(WMD) or any other weapon is strictly prohibited.**

#### **2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulation of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.**



# 2-Port Solenoid Valves for Fluid Control Precautions 1

Be sure to read this before handling products.  
For detailed precautions on each series, refer to the main text.

## Design

### Warning

#### 1. Cannot be used as an emergency shutoff valve, etc.

The valves presented in this catalog are not designed for safety applications such as an emergency shutoff valve. If the valves are used in this type of system, other reliable safety assurance measures should also be adopted.

#### 2. Extended periods of continuous energization

The solenoid coil will generate heat when continuously energized. Avoid using in a tightly shut container. Install the valve in a well-ventilated area. Furthermore, do not touch it while it is being energized or right after it has been energized.

#### 3. This solenoid valve cannot be used for explosion proof applications.

#### 4. Ensure sufficient space for maintenance activities.

When installing the products, allow access for maintenance and inspection.

#### 5. Liquid rings

In cases using a flowing liquid, provide a by-pass valve in the system to prevent the liquid from entering the liquid seal circuit.

#### 6. Actuator drive

When an actuator, such as a cylinder, is to be driven using a valve, take appropriate measures to prevent potential danger caused by actuator operation.

#### 7. Pressure (including vacuum) holding

It is not usable for an application such as holding the pressure (including vacuum) inside of a pressure vessel because air leakage is entailed in valves.

#### 8. When the conduit type is used as an equivalent to an IP65 enclosure, install a wiring conduit, etc.

#### 9. When an impact, such as water hammer, etc., caused by rapid pressure fluctuation is applied, the solenoid valve may be damaged.

#### 10. Do not disassemble the product or make any modifications, including additional machining.

Doing so may cause human injury and/or an accident.

## Selection

### Warning

#### 1. Confirm the specifications.

Give careful consideration to the operating conditions, such as the application, fluid, and environment, and use within the specified operating ranges indicated in the catalog.

#### 2. Fluid

##### 1) Type of fluids

Before using a fluid, confirm whether it is compatible with the materials from each model by referring to the fluids listed in the catalog. Use a fluid with a dynamic viscosity of 50 mm<sup>2</sup>/s or less. If there is anything you are unsure of, please contact SMC.

## Selection

### Warning

#### 2) Flammable oil, gas, etc.

Do not use the product with combustion-supporting or flammable fluids.

#### 3) Corrosive gas

Corrosive gases cannot be used, since it will lead to cracks by stress corrosion or result in other incidents.

#### 4) When a brass body is used, depending on the water quality, corrosion and internal leakage may occur. If such abnormalities occur, exchange the product for a stainless steel body.

#### 5) Use an oil-free specification if the entrance of oil particles into the passage will cause problems.

#### 6) Applicable fluids on the list may not be used depending on the operating conditions. Give adequate confirmation, and then determine a model. Keep in mind that the compatibility list refers to common use applications.

#### 3. Fluid quality

The use of a fluid that contains foreign matter can cause problems, such as malfunction and seal failure by promoting the wear of the valve seat and armature, by sticking to the sliding parts of the armature, etc. Install a suitable filter (strainer) immediately upstream from the valve. As a general rule, use 80 to 100 mesh.

When used to supply water to boilers, substances such as calcium and magnesium, which generate hard scale and sludge, are included. Since scale and sludge can cause the valve to malfunction, install water softening equipment and a filter (strainer) directly upstream from the valve to remove these substances.

#### 4. Air quality

##### 1) Use clean air.

Do not use compressed air that contains chemicals, synthetic oils that include organic solvents, salt, corrosive gases, etc., as it can cause damage or malfunction.

##### 2) Install air filters.

Install air filters upstream near the valves. A filtration size of 5 μm or less should be selected.

##### 3) Install an aftercooler, air dryer, etc.

Compressed air that contains excessive drainage may cause the malfunction of valves and other pneumatic equipment. To prevent this, install an aftercooler, air dryer, etc.

##### 4) If excessive carbon powder is generated, eliminate it by installing mist separators on the upstream side of valves.

If excessive carbon powder is generated by the compressor, it may adhere to the inside of the valves and cause malfunction.

For compressed air quality, refer to the Best Pneumatics No. 6 catalog.

#### 5. Ambient environment

Use within the operable ambient temperature range. Confirm the compatibility between the product's composition materials and the ambient atmosphere. Be certain that the fluid used does not touch the external surface of the product.

#### 6. Countermeasures against static electricity

Take measures to prevent static electricity, since some fluids can cause static electricity.

#### 7. For the low particle generation specification, please consult with SMC separately.





# 2-Port Solenoid Valves for Fluid Control Precautions 2

Be sure to read this before handling products.  
For detailed precautions on each series, refer to the main text.

## Selection

### ⚠ Warning

#### 8. Low temperature operation

1. The valve can be used in an ambient temperature of between  $-10$  to  $-20^{\circ}\text{C}$ . However, take measures to prevent the freezing or solidification of impurities, etc.
2. When using valves for water applications in cold climates, take appropriate countermeasures to prevent the water from freezing in tubing after cutting the water supply from the pump, by draining the water, etc. When warming by a heater, etc., be careful not to expose the coil portion to the heater. The installation of a dryer, retaining the heat of the body, etc., is recommended to prevent a freezing condition in which the dew point temperature is high and the ambient temperature is low, or the high flow is running.

## Mounting

### ⚠ Warning

#### 1. If air leakage increases or equipment does not operate properly, stop operation.

After mounting is completed, confirm that it has been done correctly by performing a suitable function test.

#### 2. Do not apply external force to the coil section.

When tightening is performed, apply a wrench or other tool to the outside of the piping connection ports.

#### 3. Mount a valve with its coil position upwards, not downwards.

When mounting a valve with its coil positioned downwards, foreign objects in the fluid will adhere to the iron core, leading to a malfunction. Especially for strict leakage control, such as with vacuum applications and non-leak specifications, the coil must be positioned upwards.

#### 4. Do not warm the coil assembly with a heat insulator, etc.

Use tape, heaters, etc., for freeze prevention on the piping and body only. This can cause the coil to burn out.

#### 5. Secure with brackets, except in the case of steel piping and copper fittings.

#### 6. Avoid sources of vibration, or adjust the arm from the body to the minimum length so that resonance will not occur.

#### 7. Painting and coating

Warnings or specifications printed or labeled on the product should not be erased, removed, or covered up.

## Piping

### ⚠ Caution

#### 1. Refer to the Fittings and Tubing Precautions for handling One-touch fittings.

#### 2. Preparation before piping

Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil, and other debris from inside the pipe.

Install piping so that it does not apply pulling, pressing, bending, or other forces on the valve body.

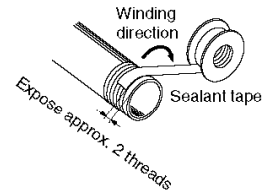
## Piping

### ⚠ Caution

#### 3. Winding of sealant tape

When connecting pipes, fittings, etc., be sure that chips from the pipe threads and sealing material do not enter the valve.

Furthermore, when sealant tape is used, leave 1.5 to 2 thread ridges exposed at the end of the threads.



#### 4. Avoid connecting ground lines to piping, as this may cause the electric corrosion of the system.

#### 5. Tighten threads with the proper tightening torque.

When attaching fittings to valves, tighten with the proper tightening torque shown below.

Tightening Torque for Piping

Connection thread	Proper tightening torque (N·m)
Rc1/8	3 to 6
Rc1/4	8 to 12
Rc3/8	15 to 20
Rc1/2	20 to 25
Rc3/4	28 to 30
Rc1	36 to 38
Rc1 1/4	40 to 42
Rc1 1/2	48 to 50
Rc2	48 to 50
Rc2 1/2	48 to 50
Rc3	48 to 50

#### 6. Connection of piping to products

When connecting piping to a product, refer to its operation manual to avoid mistakes regarding the supply port, etc.

#### 7. Steam generated in a boiler contains a large amount of drainage. Be sure to operate it with a drain trap installed.

#### 8. In applications such as vacuum and non-leak specifications, be sure to use caution to prevent contamination by foreign matter and air leakage of the fittings.

## Operating Environment

### ⚠ Warning

#### 1. Do not use in an atmosphere containing corrosive gases, chemicals, sea water, water, water steam, or where there is direct contact with any of these.

#### 2. Do not use in explosive atmospheres.

#### 3. Do not use in locations subject to vibration or impact.

#### 4. Do not use in locations where radiated heat will be received from nearby heat sources.

#### 5. Employ suitable protective measures in locations where there is contact with water droplets, oil, welding spatter, etc.





## 2-Port Solenoid Valves for Fluid Control Precautions 3

Be sure to read this before handling products.

For detailed precautions on each series, refer to the main text.

### Maintenance

#### Warning

##### 1. Removal of product

The valve will reach a high temperature when used with high temperature fluids. Confirm that the valve temperature has dropped sufficiently before performing work. If touched inadvertently, there is a danger of being burned.

1. Shut off the fluid supply and release the fluid pressure in the system.
2. Shut off the power supply.
3. Dismount the product.

##### 2. Low frequency operation

Switch valves at least once every 30 days to prevent malfunction. Also, in order to use them under the optimum state, conduct a regular inspection biannually.

#### Caution

##### 1. Filters and strainers

1. Be careful regarding clogging of filters and strainers.
2. Replace filter elements after one year of use, or earlier if the pressure drop reaches 0.1 MPa.
3. Clean strainers when the pressure drop reaches 0.1 MPa.

##### 2. Lubrication

When using after lubricating, do not forget to lubricate continuously.

##### 3. Storage

In case of long term storage after use with heated water, thoroughly remove all moisture to prevent rust, the deterioration of rubber materials, etc.

##### 4. Exhaust the drainage from air filters periodically.

### Precautions

#### Warning

1. Valves will reach high temperatures when used with high temperature fluids. Use caution, as there is a danger of being burned if a valve is touched directly.

2. For pilot type 2-port solenoid valves, when the valve is closed, sudden pressure resulting from the startup of the fluid supply source (pump, compressor, etc.) may cause the valve to open momentarily and leakage to occur, so please exercise caution.

3. When problems are caused by a water hammer, install water hammer relief equipment (accumulator, etc.), or use an SMC water hammer relief valve (VXR series). Please consult with SMC for details.

4. Make sure when using pilot type 2-port solenoid valves that the flow direction is from 1 (IN) to 2 (OUT). The valve is designed based on a flow direction of 1 (IN) to 2 (OUT) and harnesses the fluid pressure of port 1 (IN) when the valve opens or closes. If reverse pressure (2 (OUT) to 1 (IN)) is applied, it may lead to a reduced service life or cause premature damage to parts, due to chattering or pulses from the main valve (diaphragm, piston, etc.). If there is a possibility that reverse pressure will be applied, take countermeasures by installing a check valve, etc., on the downstream side. When installing the check valve, allow ample space between the valve and the check valve. If it is placed near the valve, it may cause chattering and pulses in the main valve.

Applicable models

- Pilot type 2-port solenoid valve  
VXD, VXED, VXZ, VXEZ, VXS, VXP, and VXR series

### Return of Product

#### Warning

If the product to be returned is contaminated or is possibly contaminated with substances that are harmful to humans, for safety reasons, please contact SMC beforehand and then employ a specialist cleaning company to decontaminate the product. After the decontamination prescribed above has been carried out, submit a Product Return Request Sheet or the Detoxification/Decontamination Certificate to SMC and await SMC's approval and further instructions before attempting to return the item. Please refer to the International Chemical Safety Cards (ICSC) for a list of harmful substances. If you have any further questions, please don't hesitate to contact your SMC sales representative.



# VXP Series / Specific Product Precautions and Glossary of Terms

Be sure to read this before handling the products.

## Wiring

### ⚠ Caution

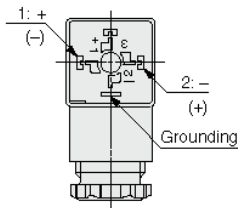
1. As a rule, use electrical wire with a cross sectional area of 0.5 to 1.25 mm<sup>2</sup> for wiring. Furthermore, do not allow excessive force to be applied to the lines.
2. Use electrical circuits which do not generate chattering in their contacts.
3. Use voltage which is within  $\pm 10\%$  of the rated voltage. In cases with a DC power supply where importance is placed on responsiveness, stay within  $\pm 5\%$  of the rated value. The voltage drop is the value in the lead wire section connecting the coil.
4. When a surge from the solenoid affects the electrical circuitry, install a surge voltage suppressor etc., in parallel with the solenoid. Or, adopt an option that comes with the surge voltage protection circuit. (However, a surge voltage occurs even if the surge voltage protection circuit is used. For details, please consult with SMC.)

## Electrical Connections

### ■ DIN terminal

### ⚠ Caution

Internal connections are as shown below. Make connections to the power supply accordingly.



Terminal no.	1	2
DIN terminal	+(-)	-(+)

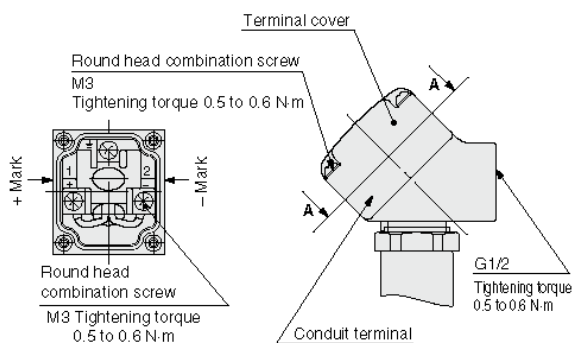
\* There is no polarity.

### ■ Conduit terminal

### ⚠ Caution

Make connections according to the marks shown below.

- Use the tightening torques below for each section.
- Properly seal the terminal connection (G1/2) with the special wiring conduit etc.



View A-A

(Internal connection diagram)

## Pressure Terminology

### 1. Maximum operating pressure differential

The maximum pressure differential (the difference between the inlet and outlet pressure) which is allowed for operation. When the outlet pressure is 0 MPa, this becomes the maximum operating pressure.

### 2. Minimum operating pressure differential

The minimum pressure differential (the difference between the inlet pressure and outlet pressure) required to keep the main valve fully open.

### 3. Maximum system pressure

The maximum pressure that can be applied inside the pipelines (line pressure).

[The pressure differential of the solenoid valve portion must not exceed the maximum operating pressure differential.]

### 4. Withstand pressure

The pressure in which the valve must be withstood without a drop in performance after holding for one minute under prescribed pressure and returning to the operating pressure range. [value under the prescribed conditions]



# Pilot Operated 2 Port Solenoid Valve

## VXP21/22/23 Series

# Applicable Fluids Check List

## Normally Closed (N.C.)

Refer to page 8 for specifications and models.



### Option Symbol and Composition

Option symbol	Seal material	Coil insulation type	Body, Shading coil material
Standard	NBR	B	C37 or CAC408, Copper
A	FKM		
B	EPDM		
C <sup>Note 2)</sup>	PTFE		
D	FKM	H	
E	EPDM		
F <sup>Note 1)</sup>	FKM	B	Stainless steel, Silver (Not available for VXP2270/2380/2390)
G	NBR		
H	FKM		
J	EPDM		
K <sup>Note 2)</sup>	PTFE		
L <sup>Note 1)</sup>	FKM		
N	FKM		
P	EPDM		
Q <sup>Note 2)</sup>	PTFE(FKM)	H	
S <sup>Note 2)</sup>	PTFE(FKM)		
T <sup>Note 1)</sup>	NBR	B	C37 or CAC408, Copper

Note 1) Non-lube type. For other options, "-X21" at the end of product number represents the non-lube option.

Note 2) Available option for VXP2130.

### Fluid Name and Option

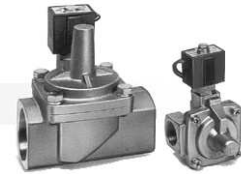
Fluid (Application)	Option symbol and body material	
	C37 or CAC408	Stainless steel
Applicable valve	10A to 50A <sup>Note 1)</sup>	10A to 25A
Ethyl alcohol	F, B	L, J
Ethylene glycol	B	J
Caustic soda (25% ≥)	—	J
Gas oil	A	H
Silicone oil	A	H
Fuel oil (up to 60°C)	A	H
Fuel oil (up to 100°C)	D	N
Steam system (Steam)	S	Q
Steam system (Boiler water)	—	G, J
Steam system (Condensate)	E	P
Insulation oil	A	H
Naphtha	A	H
Parachloroethylene	A	H
Brake oil	B	J
Water (up to 99°C)	D, E	N, P

\* If using for other fluids, please contact SMC.

Note 1) 10A to 25A are C37 and 32A to 50A are CAC408.

## Normally Open (N.O.)

Refer to page 10 for specifications and models.



### Option Symbol and Composition

Option symbol	Seal material	Coil insulation type	Body, Shading coil material	Holder material (in core assembly)
Standard <sup>Note 2)</sup>	NBR	B	C37 or CAC408, Copper	POM
A	FKM			
B	EPDM			
C	PTFE			
D <sup>Note 2)</sup>	FKM	H		Stainless steel
E	EPDM			
F <sup>Note 1)</sup>	FKM	B	Stainless steel, Silver (Not available for VXP2272/2382/2392)	POM
G	NBR			
H	FKM			
J	EPDM			
K	PTFE			
L <sup>Note 1)</sup>	FKM			
N	FKM			
P	EPDM			
Q	PTFE(FKM)	H		Stainless steel
S	PTFE(FKM)			
T <sup>Note 1)</sup>	NBR	B	C37 or CAC408, Copper	POM
X <sup>Note 1)</sup>	FKM	H		Stainless steel

Note 1) Non-lube type. For other options, "-X21" at the end of product number represents the non-lube option.

Note 2) Grease has been applied to the core part.

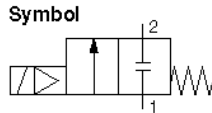
### Fluid Name and Option

Fluid (Application)	Option symbol and body material	
	C37 or CAC408	Stainless steel
Applicable valve	15A to 50A <sup>Note 1)</sup>	15A to 25A
Caustic soda (25% ≥)	—	J
Gas oil	A	H
Silicone oil	A	H
Fuel oil (up to 60°C)	A	H
Fuel oil (up to 100°C)	D	N
Steam system (Steam)	S	Q
Steam system (Boiler water)	—	G, J
Steam system (Condensate)	E	P
Insulation oil	A	H
Parachloroethylene	A	H
Brake oil	B	J
Water (up to 99°C)	E	N, P

\* If using for other fluids, please contact SMC.

Note 1) 15A to 25A are C37 and 32A to 50A are CAC408.

# Normally Closed (N. C.)



When the valve is closed, flow is blocked from port 1 to port 2. However, if the pressure in port 2 is higher than port 1, the valve will not be able to block the fluid and it will flow from port 2 to port 1.

## Fluid

Standard specifications	Option <sup>Note 1)</sup>
Water (Standard)	Steam..... (S)
Air	High temperature water..... (D, E)
Turbine oil	High temperature oil..... (D)

Note 1) Refer to page 7 "Applicable Fluids Check List" for details of special fluids outside of the standard options and specifications.

## Model/Valve Specifications <Normally Closed>

Connection Thread	Orifice dia. (mm)	Model	Min. operating pressure differential (MPa)	Maximum operating pressure differential <sup>Note 2)</sup> (MPa)							Flow rate characteristics					No. 2) Max. system pressure (MPa)	No. 1) Weight (g)
				Water		Air		Oil		Steam	Water, Oil, Steam		Air				
				AC	DC	AC	DC	AC	DC	AC	Kv	Cv converted	C [dm <sup>3</sup> /(s·bar)]	b	Cv		
1/4	10	VXP2130-02	0.04	0.7	0.5	0.9	0.7	0.5	0.4	0.9	1.6	1.9	8.5	0.35	2.0	Water, Air, Oil	420
3/8	10	VXP2130-03	0.04	0.7	0.5	0.9	0.7	0.5	0.4	0.9	2.1	2.4	9.2	0.35	2.4		420
	15	VXP2140-03	0.04	1.0	1.0	1.0	1.0	0.7	0.7	1.0	3.6	4.2	18	0.35	5.0	740	
1/2	10	VXP2130-04	0.04	0.7	0.5	0.9	0.7	0.5	0.4	0.9	2.1	2.4	9.2	0.35	2.4	1.5 Steam	500
	15	VXP2140-04	0.04	1.0	1.0	1.0	1.0	0.7	0.7	1.0	4.6	5.3	20	0.35	5.5	1.0	740
3/4	20	VXP2150-06	0.04	1.0	1.0	1.0	1.0	0.7	0.7	1.0	7.9	9.2	38	0.30	9.2		1900

Connection Thread Flange	Orifice diameter (mm)	Model	Min. operating pressure differential (MPa)	Maximum operating pressure differential <sup>Note 2)</sup> (MPa)							Flow rate characteristics			No. 2) Max. system pressure (MPa)	No. 1) Weight (g)
				Water		Air		Oil		Steam	Water, Oil, Steam		Air		
				AC	DC	AC	DC	AC	DC	AC	Kv	Cv converted	Effective area (mm <sup>2</sup> )		
1	25	VXP2260-10	0.04	1.0	1.0	1.0	1.0	0.7	0.7	1.0	10	12	215	Water Air Oil	1810
1 1/4	35	VXP2270-12	0.03	1.0	1.0	1.0	1.0	0.7	0.7	1.0	20	23	415		3300
1 1/2	40	VXP2380-14	0.03	1.0	1.0	1.0	1.0	0.7	0.7	1.0	26	31	560	1.5 Steam	4200
2	50	VXP2390-20	0.03	1.0	1.0	1.0	1.0	0.7	0.7	1.0	43	49	880		5400
—	32A	VXP2270-32	0.03	1.0	1.0	1.0	1.0	0.7	0.7	1.0	20	23	415	1.0	5900
—	40A	VXP2380-40	0.03	1.0	1.0	1.0	1.0	0.7	0.7	1.0	26	31	560		7900
—	50A	VXP2390-50	0.03	1.0	1.0	1.0	1.0	0.7	0.7	1.0	43	49	880		9200

Note) Weight of grommet type. Add 10 g for conduit type, 30g for DIN terminal type, 60 g for conduit terminal type respectively.  
 • Refer to "Glossary of Terms" on page 6 for detail of max. operating pressure differential and max. system pressure.  
 • VXP2130: Option "C", "K", "Q", "S" only.

## Solenoid Specifications

Model	Power source	Frequency (Hz)	Apparent power (VA)		Power consumption (W) (Holding)	Temperature rise (°C) (Rated voltage)
			Inrush	Holding		
VXP21	AC	50	20 (32)	11	4.5	45
		60	17 (28)	7	3.2	35
VXP22	DC	—	—	—	6	55
		—	—	—	—	—
VXP22	AC	50	40	18	7.5	60
		60	35	12	6	50
VXP23	DC	—	—	—	8	60
		—	—	—	—	—
VXP23	AC	50	50	21	11	65
		60	45	17	9.5	60
VXP23	DC	—	—	—	11.5	65
		—	—	—	—	—

Note) • The return voltage is 20% or more of the rated voltage for AC and 2% or more for DC.  
 • The allowable voltage fluctuation rate is ±10% of the rated voltage value for both AC and DC.  
 • When the ambient temperature is 20°C ± 5°C and rated voltage is applied.  
 • For VXP2130, changing coils from AC to DC and vice versa is impossible, because of different core shapes. VXP2130, 2230, 2330 are possible to exchange coil from AC to DC, but impossible from DC to AC.  
 (Hum sound may generate because of no shading coil for DC.)  
 • ( ) : VXP2130

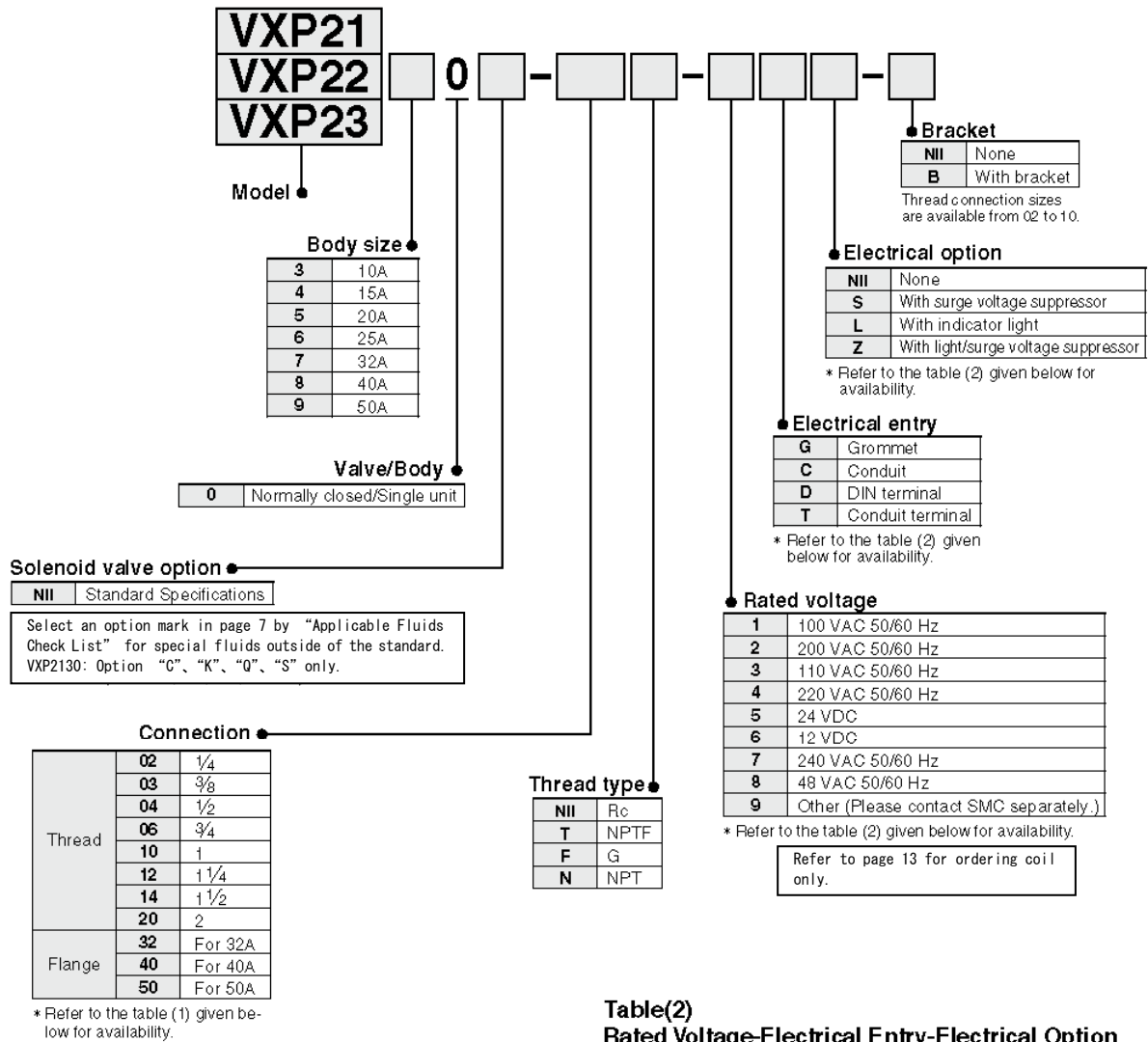
**⚠ Be sure to read "Specific Product Precautions."**

## Operating Fluid and Ambient Temperature

Temperature conditions	Power source	Operating fluid temperature (°C)						Ambient temperature (°C)
		Water (Standard)	Air (Standard)	Oil (Standard)	High temperature water <sup>Note 3)</sup> (D, E)	High temperature oil <sup>Note 3)</sup> (D)	Steam <sup>Note 3)</sup> (S)	
Maximum	AC	60	80	60	99	100	183	60
	DC	40	60	40	—	—	—	40
Minimum	AC	1	—10 <sup>Note 1)</sup>	—5 <sup>Note 2)</sup>	—	—	—	—10
	DC	—	—	—	—	—	—	—

Note 1) Dew point: -10°C or less      Note 2) 50 mm<sup>2</sup>/s or less  
 Note 3) "D", "E" etc. in parentheses are option symbols.  
 Note 4) VXP2130: Option "C", "K", "Q", "S" only.

## How to Order (Normally Closed)



**Table(1)  
Connection Size and Applicable Model**

Connection	Size	Applicable model
Thread	1/4	VXP2130-02
	3/8	VXP2130-03, VXP2140-03
	1/2	VXP2130-04, VXP2140-04
	3/4	VXP2150-06
	1	VXP2260-10
	1 1/4	VXP2270-12
	1 1/2	VXP2380-14
Flange	2	VXP2390-20
	32A	VXP2270-32
	40A	VXP2380-40
	50A	VXP2390-50

### Ordering example

(Example) VXP22 series, Rc 1 1/4, 100 VAC  
Grommet  
(Part no.) VXP2270-12-1G

**Table(2)  
Rated Voltage-Electrical Entry-Electrical Option**

Insulation type	Class B				Class H		
	G	C	D, T	G, C	S	L, Z	
Electrical entry	G	C	D, T	G, C	S	L, Z	
Electrical option	S <sup>Note)</sup>	—	S, L, Z	—	S	L, Z	
AC	1 (100 V)	●	●	●	●	●	
	2 (200 V)	●	●	●	●	●	
	3 (110 V)	●	●	●	●	●	
	4 (220 V)	●	●	●	●	●	
	7 (240 V)	●	●	—	●	—	
DC	5 (24 V)	●	●	●	—	—	
	6 (12 V)	●	●	—	—	—	

Note) Surge voltage suppressor is attached in the middle of lead wire.



### Made to Order Specifications

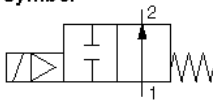
**Splashproof Specifications** (Based on JIS C 0920  
Based on IEC529IP-X4)

VXP[Model]—[Port size]—[Electrical entry]- X36

DIN terminal or class H coil not available.

# Normally Open (N. O.)

Symbol



When the valve is closed, flow is blocked from port 1 to port 2. However, if the pressure in port 2 is higher than port 1, the valve will not be able to block the fluid and it will flow from port 2 to port 1.

## Fluid

Standard specifications	Option <sup>Note 1)</sup>
Water (Standard)	Steam ..... (S)
Air	High temperature water ..... (D, E)
Turbine oil	High temperature oil ..... (D)

Note 1) Refer to page 7 "Applicable Fluids Check List" for details of special fluids outside of the standard options and specifications.

## Model/Valve Specifications <Normally Open>

Connection		Orifice dia (mm)	Model	Min. operating pressure differential (MPa)	Max. operating pressure differential <sup>Note 3)</sup> (MPa)			Flow rate characteristics					Max. system pressure <sup>Note 2)</sup> (MPa)	Weight <sup>Note 1)</sup> (g)
Thread	Flange				Water, Air	Oil	Steam	Water, Oil, Steam		Air				
					AC/DC	AC/DC	AC	Kv	Cv converted	C [dm <sup>3</sup> /s·bar]	b	Cv		
3/8	—	15	VXP2142-03	0.04	0.7	0.6	0.7	3.6	4.2	18	0.35	5.0	Water, Air, Oil	760
1/2	—	15	VXP2142-04	0.04	0.7	0.6	0.7	4.6	5.3	20	0.35	5.5	1.5 Steam	760
3/4	—	20	VXP2152-06	0.04	0.7	0.6	0.7	7.9	9.2	38	0.30	9.2	1.0	1320

Connection		Orifice dia (mm)	Model	Min. operating pressure differential (MPa)	Max. operating pressure differential <sup>Note 3)</sup> (MPa)			Flow rate characteristics				Max. system pressure <sup>Note 2)</sup> (MPa)	Weight <sup>Note 1)</sup> (g)
Thread	Flange				Water, Air	Oil	Steam	Water, Oil, Steam		Air			
					AC/DC	AC/DC	AC	Kv	Cv converted	Effective area (mm <sup>2</sup> )			
1	—	25	VXP2262-10	0.04	0.7	0.6	0.7	10	12	215	Water, Air, Oil 1.5 Steam 1.0	1850	
1 1/4	—	35	VXP2272-12	0.03	0.7	0.6	0.7	20	23	415		3300	
1 1/2	—	40	VXP2382-14	0.03	0.7	0.6	0.7	26	31	560		4200	
2	—	50	VXP2392-20	0.03	0.7	0.6	0.7	43	49	880		5400	
—	32A	35	VXP2272-32	0.03	0.7	0.6	0.7	20	23	415		5900	
—	40A	40	VXP2382-40	0.03	0.7	0.6	0.7	26	31	560		7900	
—	50A	50	VXP2392-50	0.03	0.7	0.6	0.7	43	49	880		9200	

Note) Weight of grommet type. Add 10 g for conduit type, 30g for DIN terminal type, 60 g for conduit terminal type respectively.  
 • Refer to "Glossary of Terms" on page 6 for detail of max. operating pressure differential and max. system pressure.

## Solenoid Specifications

Model	Power source	Frequency (Hz)	Apparent power (VA)		Power consumption (W) (Holding)	Temperature rise (°C) (Rated voltage)
			Inrush	Holding		
VXP21	AC	50	25	12	5	50
	DC	60	20	8	3.5	35
VXP22	AC	50	45	20	8	55
	DC	60	40	15	6.5	45
VXP23	AC	50	60	25	10.5	60
	DC	60	50	20	9.5	50

**⚠ Be sure to read "Specific Product Precautions."**

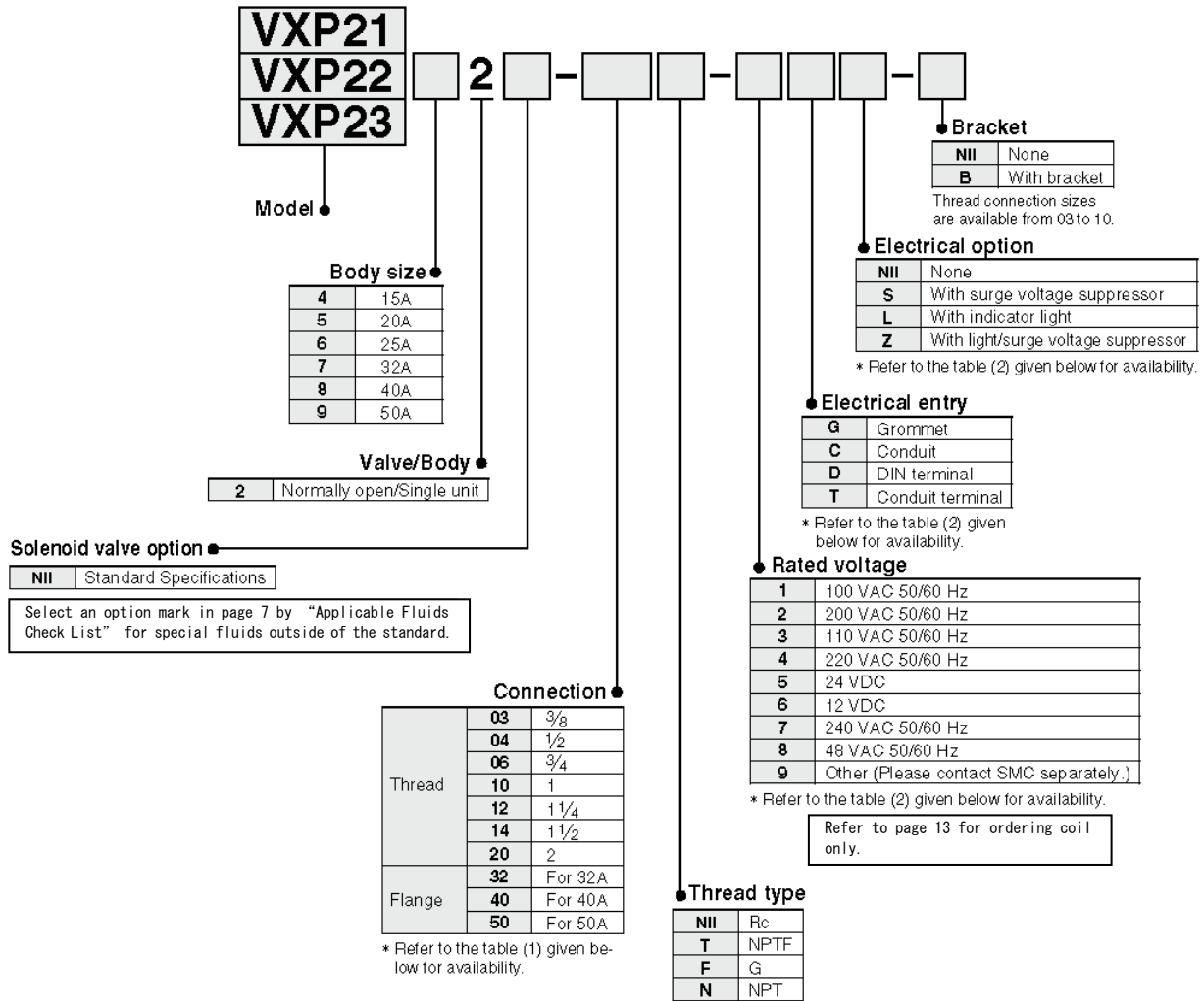
Note) • They are values in an ambient temperature of 20°C ±5°C and application of rated voltage.  
 • Changing coils from AC to DC and vice versa is impossible, because of different core shapes.  
 • Return voltage is 20% or more of the rated value at AC power and 5% or more at the DC power.  
 • The allowable voltage fluctuation rate is ±10% of the rated voltage value for both AC and DC.

## Fluid and Ambient Temperature

Temperature conditions	Power source	Fluid temperature (°C)						Ambient temperature (°C)
		Water (Standard)	Air (Standard)	Oil (Standard)	High temperature water <sup>Note 3)</sup> (X, E)	High temperature oil <sup>Note 3)</sup> (D)	Steam <sup>Note 3)</sup> (S)	
Maximum	AC	60	80	60	99	100	183	60
	DC	40	60	40	—	—	—	40
Minimum	AC	1	-10 <sup>Note 1)</sup>	-5 <sup>Note 2)</sup>	—	—	—	-10
	DC	1	-10 <sup>Note 1)</sup>	-5 <sup>Note 2)</sup>	—	—	—	

Note 1) Dew point: -10°C or less      Note 2) 50 mm<sup>2</sup>/s or less  
 Note 3) "D", "E" etc. in parentheses are option symbols.

## How to Order (Normally Open)



**Table (1)  
Connection Size and Applicable Model**

Connection	Size	Applicable model
Thread	3/8	VXP2142-03
	1/2	VXP2142-04
	3/4	VXP2152-06
	1	VXP2262-10
	1 1/4	VXP2272-12
Flange	1 1/2	VXP2382-14
	2	VXP2392-20
	32A	VXP2272-32
	40A	VXP2382-40
	50A	VXP2392-50

**Ordering example**

(Example) VXP22 series, 32A Flange, 200 VAC,  
DIN terminal  
(Part no.) **VXP2272-32-2D**

**Table (2)  
Rated Voltage-Electrical Entry-Electrical Option**

Insulation type	Class B				Class H		
	G	C	D, T	G, C	S	L, Z	
Electrical entry	S <sup>100%</sup>						
Electrical option	S <sup>100%</sup>						
AC	1 (100 V)	●	●	●	●	●	●
	2 (200 V)	●	●	●	●	●	●
	3 (110 V)	●	●	●	●	●	●
	4 (220 V)	●	●	●	●	●	●
DC	7 (240 V)	●	●	●	—	●	—
	8 (48 V)	●	●	●	—	●	—
	5 (24 V)	●	●	●	—	—	—
	6 (12 V)	●	●	●	—	—	—

Note) Surge voltage suppressor is attached in the middle of lead wire.



**Made to Order Specifications**

**Splashproof Specifications** (Based on JIS C 0920 / Based on IEC529IP-X4)

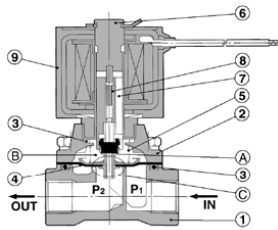
VXP [Model] — [Port size] — [Electrical entry] - X36

DIN terminal or class H coil not available.

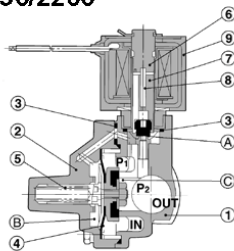
# Construction/Principle Parts Material

## Normally Closed (N.C.)

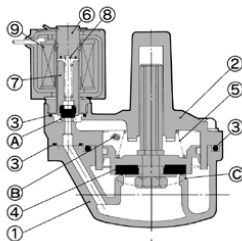
VXP2130



VXP2140/2150/2260



VXP2270/2380/2390



### Operation

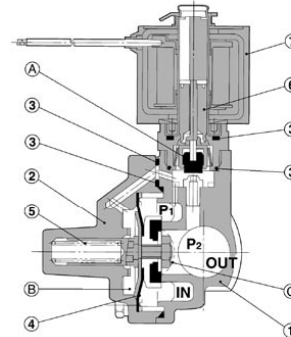
<Valve opened> When the coil (9) is energized, the armature assembly (7) is attracted into the core of the core assembly (6) and the pilot valve (2) opens. Then the pressure in the pressure action chamber (B) falls to open the main valve (1).

<Valve closed> When the coil (9) is not energized, the pilot valve (2) is closed and the pressure in the pressure action chamber (B) rises and the main valve (1) closes.

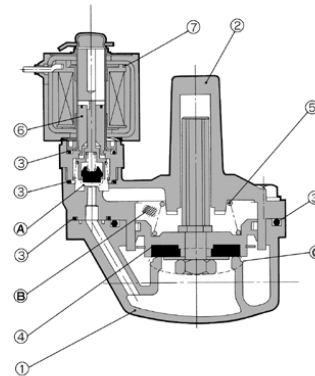
No.	Description	Size	Material	
			Standard	Option
1	Body	10A to 25A	C37	Stainless steel
		32A to 50A	CAC408	—
2	Bonnet	10A to 25A	C37	Stainless steel
		32A to 50A	CAC408	—
3	O-ring	—	NBR	FKM/EPDM
4	Disk assembly	10A to 25A	Stainless steel, C37, NBR	Stainless steel, FKM Stainless steel, EPDM
		32A to 50A	Stainless steel, C37 FKM/EPDM	Stainless steel, C37 FKM/EPDM
5	Valve spring	—	Stainless steel	—
6	Core assembly	10A to 25A	Stainless steel, Copper	Stainless steel, Silver
		32A to 50A	—	—
7	Armature assembly	—	Stainless steel, NBR	Stainless steel, FKM Stainless steel, EPDM
8	Return spring	—	Stainless steel	—
9	Coil assembly	—	Class B molded	Class H molded

## Normally Open (N.O.)

VXP2142/2152/2262



VXP2272/2382/2392



### Operation

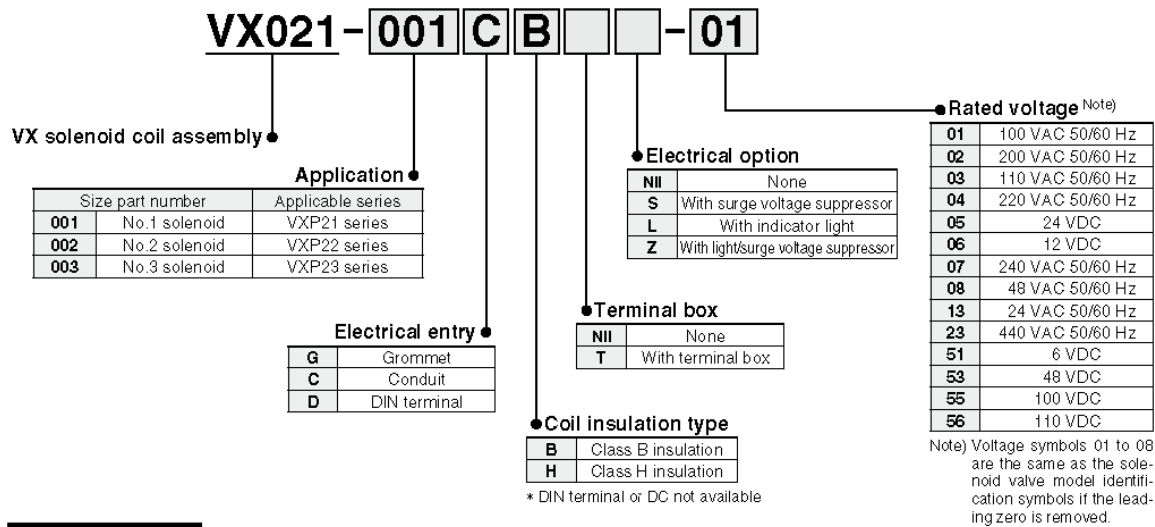
<Valve closed> When the coil (7) is energized, the opened pilot (2) closes, the pressure in pressure action chamber (B) rises and the main valve (1) closes.

<Valve opened> When coil (7) is not energized, the closed pilot valve (2) opens, the pressure in pressure action chamber (B) drops and the main valve (1) opens.

No.	Description	Size	Material	
			Standard	Option
1	Body	15A to 25A	C37	Stainless steel
		32A to 50A	CAC408	—
2	Bonnet	15A to 25A	C37	Stainless steel
		32A to 50A	CAC408	—
3	O-ring	—	NBR	FKM/EPDM
4	Disk assembly	15A to 25A	Stainless steel, C37, NBR	Stainless steel, FKM Stainless steel, EPDM
		32A to 50A	Stainless steel, C37 FKM/EPDM	Stainless steel, C37 FKM/EPDM
5	Valve spring	—	Stainless steel	—
6	Core assembly	15A to 25A	Stainless steel, Copper, NBR	Stainless steel, Silver FKM/EPDM, PTFE
		32A to 50A	POM PTFE	Stainless steel, Copper, FKM/EPDM, PTFE
7	Coil assembly	—	Class B molded	Class H molded

# Solenoid Coil Assembly

## How to Order Solenoid Coil Assemblies



### Ordering example

- (Example) VXP21 series, 100 VAC, class B insulation, grommet  
(Part no.) **VX021-001GB-01**
- (Example) VXP22 series, 220 VAC, class B insulation, DIN terminal (with terminal box)  
(Part no.) **VX021-002DBT-04**
- (Example) VXP23 series, 24 VDC, conduit terminal, with light/surge voltage suppressor  
(Part no.) **VX021-003CBTZ-05**

### Coil Combination Table

(Electrical entry - Coil insulation type - Electrical option)

Electrical entry	Without electrical option	With electrical option		
		With surge voltage suppressor	With indicator light	With light/surge voltage suppressor
Grommet	GB	GBS	—	—
	GH	—	—	—
Conduit	CB	—	—	—
	CH	—	—	—
	CBT	CBTS	CBTL	CBTZ
	CHT	CHTS	CHTL	CHTZ
DIN terminal	DB	—	—	—
	DBT	DBTS	DBTL	DBTZ

\* Applicable voltages for with indicator light or with light/surge voltage suppressor are 100 VAC, 200 VAC, 110 VAC, 220 VAC and 24 VDC.

\* Applicable voltages for CHTL or CHTZ are 100 VAC, 200 VAC, 110 VAC and 220 VAC.

# Trouble shooting

If abnormal operations occur while in use,  
please check the following flowchart and take the appropriate measures.

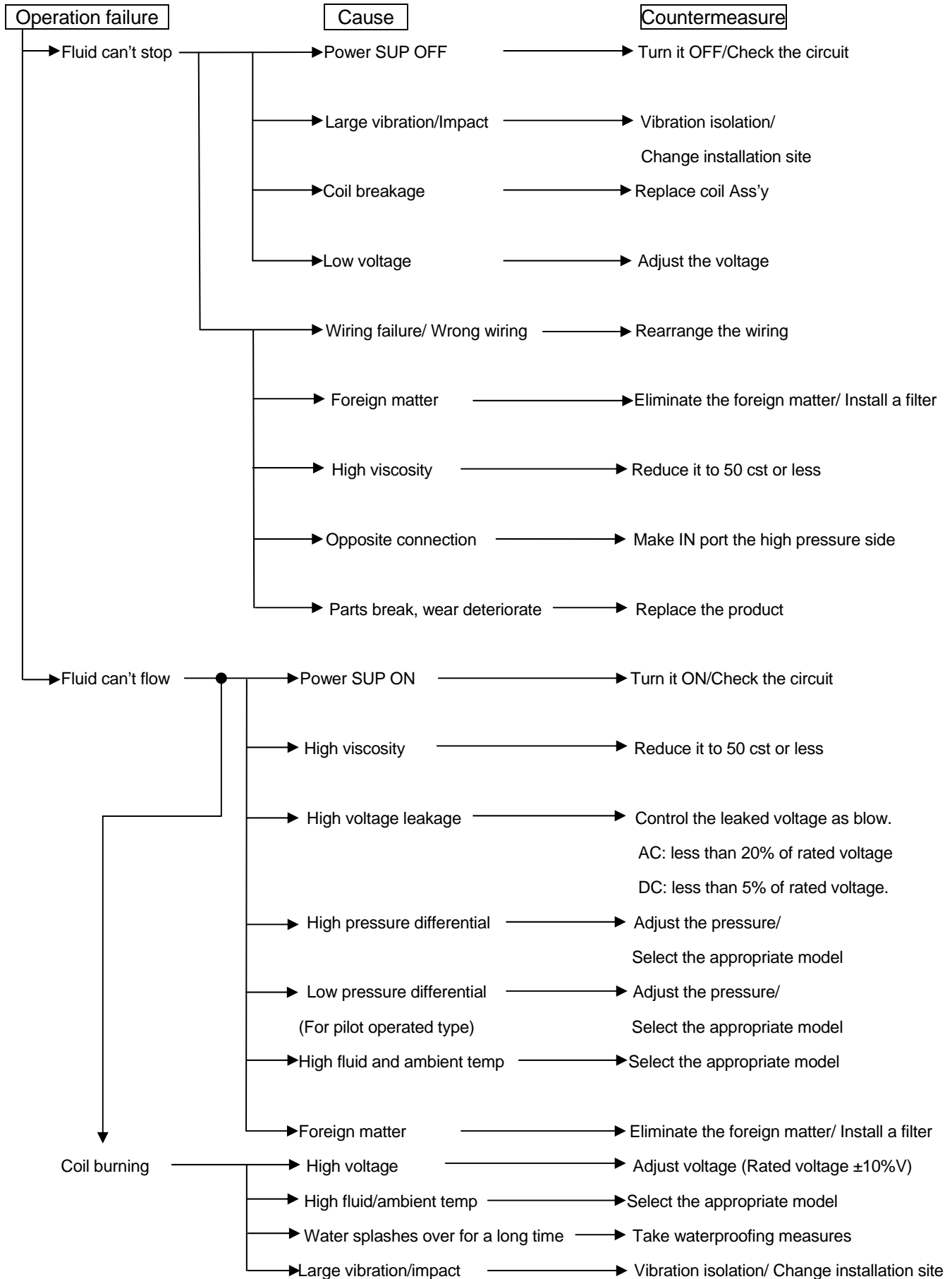
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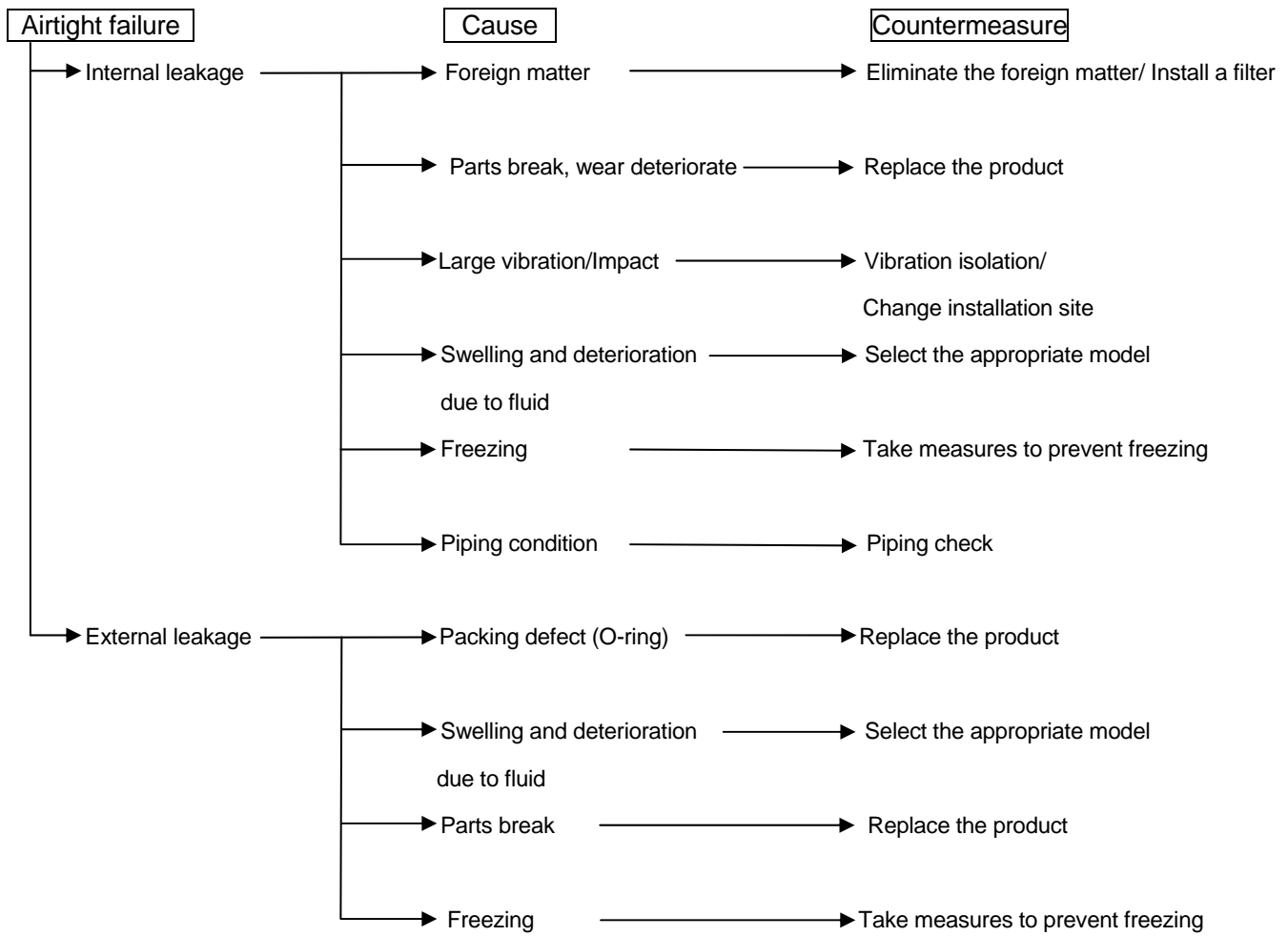




If abnormal operations occur while in use,  
 please check the following flowchart and take the appropriate measures.

<For Normal Open (N.O.)>





Revision history
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Note: Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.  
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